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Signed Andrew Gerry

Dated 28 January 2000

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office
Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference — Q037023PGB

2. Patent application number *(The Patent Office will fill in this part)* — 9900772.6

3. Full name, address, and postcode of the or of each applicant *(underline all surnames)* — Cadbury Schweppes plc
25 Berkeley Square
London, W1X 6HT
England

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation — England 3605944003

4. Title of the invention — PROCESS FOR MAKING CONFECTIONERY

5. Name of your agent *(if you have one)* — Marks & Clerk

"Address for Service" in the United Kingdom to which all correspondence should be sent *(including the postcode)* — Alpha Tower
Suffolk Street Queensway
Birmingham B1 1TT

Patents ADP number *(if you know it)* — 18002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application give the number and filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as applicant, or

c) any named applicant is a corporate body.

See note (d)) — YES

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document.

Continuation sheets of this form

Description 8

Claim(s) 9

Abstract

Drawing(s)

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*

Request for preliminary examination and search *(Patents Form 9/77)*

Request for substantive examination *(Patents Form 10/77)*

Any other documents *(please specify)*

11. I/We request the grant of a patent on the basis of this application.

Signature

Date 14/1/99

12. Name and daytime telephone number of person to contact in the United Kingdom A R Pearce 0121 643 5881

Warning

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PROCESS FOR MAKING CONFECTIONERY

The present invention relates to a process for making expanded confectionery, and more particularly to a process for setting expanded confectionery.

Expanded confectionery (i.e. confectionery incorporating air and/or other gas; carbon dioxide or nitrogen, for example) is well known. It may be formed by adding gas directly into the confectionery composition, for example by mechanical beating and optionally subjecting the confectionery to a reduced pressure or by injecting gas under pressure and subsequently releasing the pressure (e.g. extrusion). Alternatively (or in combination with the above), a chemical agent (e.g. sodium bicarbonate) may be incorporated into the confectionery composition, which agent results in the formation of gas in the confectionery composition.

A particular difficulty in the formation of expanded confectionery is obtaining a consistent product with the required degree of expansion necessary for a desired texture and mouthfeel. Over-expansion may result in confectionery having a hollow interior. Conversely, care must be taken not to allow the expanded confectionery to collapse before it has set properly. This is a particular problem if expansion is effected at an elevated temperature, in which case the confectionery must be solidified under carefully controlled conditions. For example, if expansion is effected under vacuum at an elevated temperature, the vacuum must generally be maintained until the moisture content of the confectionery has reduced sufficiently for it to set. In another method, the expanded

confectionery is stabilised by reducing its moisture content by conditioning at elevated temperature (approximately 100°C) for one hour or more before being allowed to cool. Such processes may be time consuming and costly.

It is an object of the present invention to provide an improved process for setting expanded confectionery which obviates or mitigates the above-mentioned problems.

According to the present invention, there is provided a process for setting expanded confectionery, comprising the steps of passing a soft expanded confectionery composition at a first temperature and a first pressure into a setting region at a second temperature, said second temperature being lower than said first temperature; and cooling and setting said soft expanded confectionery composition in the setting region at a second pressure which is lower than said first pressure.

As used herein, "soft" in relation to the expanded confectionery composition relates to such confectionery composition which has been expanded but which is still in a plastic state and is therefore capable of further expansion or contraction.

Preferably, the first temperature is typically in the range 70 to 150°C. The first pressure is preferably substantially atmospheric pressure.

The second temperature is preferably in the range of 10 to 50 °C but is typically ambient temperature. The second pressure is preferably in the range of 2×10^4 to 7×10^4 Pa, more preferably 3.3×10^4 to 5×10^4 Pa.

Preferably, the setting region is substantially maintained at the second temperature and the second pressure, thereby allowing the process to be continuous. More preferably, the setting region is provided with an inlet and an outlet, and is arranged such that the soft expanded confectionery composition enters the setting region via the inlet, and set confectionery composition emerges from the outlet.

In one embodiment, the expanded confectionery composition is carried through the setting region by a belt conveyor. The residence time of the confectionery composition in the setting region may be controlled by adjusting the speed of the conveyor. The time required to set the soft expanded confectionery composition can be ten minutes or less and can be as short as about three minutes.

In general, expansion of a confectionery composition requires an expanding agent to be incorporated into the composition. For example, a chemical expanding agent such as sodium or ammonium bicarbonate may be included as an ingredient of the composition. Alternatively or additionally, a gaseous or vaporisable expanding agent, e.g. gaseous or supercritical carbon dioxide or nitrogen or compressed air, may be incorporated into the composition.

Expansion may be at least partially effected by application of heat and/or by reduction of pressure (e.g. application of partial vacuum or extrusion through a die from a relatively high pressure region into a relatively low pressure region).

The confectionery composition will generally contain (in addition to any expanding agent) one or more ingredients selected from cocoa solids, sugar, other carbohydrate (e.g. mono-, di-, oligo- and poly-saccharides) malted milk, malt extract, skim milk powder, whole milk powder, maltodextrin, vegetable oil or fat, starch, binding agents such as gluten, casein, pectin, gum and gelatin, flavouring agents and colouring agents.

The confectionery composition may be subjected to a forming procedure, in which the confectionery composition is formed into pieces of a desired shape, for example bars or "balls" (i.e. pieces of a near spherical shape). Such forming procedure may involve deposition of the confectionery composition into moulds prior to expansion. Alternatively, the forming procedure may be effected on the expanded but soft confectionery composition (for example cutting an expanded composition into pieces following extrusion and optionally tumbling the pieces to form balls).

In a preferred embodiment, the soft expanded confectionery composition is formed by extrusion, preferably using an extrusion cooker.

In a highly preferred embodiment, the extruded soft expanded confectionery composition is cut into pieces and is formed into balls by tumbling, during which process the expanded confectionery composition

is heated to the first temperature prior to being passed into the setting region.

Subsequent to setting, the set expanded confectionery pieces may be sent for packaging or be subjected to a further procedure, for example enrobing with, for example, a chocolate coating composition.

The present invention will now be described in more detail in the following Examples.

Example 1

Recipe (kg)	
Sugar	57.9
Dried corn syrup	36.1

A batch was weighed according to the above recipe and mixed in a ribbon blender. The resultant composition was added to section 1 of the feed zone of an 11-section Wenger TX52 twin co-rotating screw extrusion cooker at the rate of 21 kg/hr. Section 6 of the extruder was furnished with a vent which, in this example, was open to the atmosphere. The extruder shaft speed was 210 rpm and extruder motor load was 48%. The extruder temperature in sections 1 to 3 was maintained between 30 and 40°C, sections 4 to 6 between 140 and 150°C and sections 6 to 11 between 60 and 65°C. A freshly prepared slurry of sodium bicarbonate (6 kg) in 42DE corn syrup (4 kg) was pumped into the open extruder vent at

a rate of 2.3 kg/hr. The mass at 1030 kPa from section 11 was extruded through a circular die to form a continuous rope.

The rope emerging from the die (into a region at atmospheric pressure) was passed under a starch feeder to be coated with starch before being cut by a spring-loaded knife producing small cylindrical pieces. These were transferred to a vibrating conveyor to form approximately spherical pieces with a temperature of about 120°C and a uniform expanded structure. The pieces were equilibrated to 70°C so as to be in the "soft" state and then passed from the vibrating conveyor to a vacuum oven (temperature 20°C and pressure 6×10^4 Pa) so as to cool and set the pieces. On removal from the oven after only 3 minutes retention time, the pieces were crisp and had retained their uniform expanded structure.

Example 2

Recipe (kg by weight)

Granulated sugar	37.9
Dried glucose syrup solids 42DE	25.2
Skim milk powder	29.0
Low fat (11%) cocoa powder	7.9

A batch was weighed according to the above recipe and mixed in a ribbon blender. The resultant composition was added to section 1 of the feed zone of an 11-section Wenger TX52 twin co-rotating screw extrusion cooker at the rate of 50 kg/hr. Section 6 of the extruder was furnished

with a vent which, in this example, was open to the atmosphere. The extruder shaft speed was 150 rpm and extruder motor load was 89%. The extruder temperature in sections 1 to 3 was maintained between 30 and 40°C, sections 4 to 6 at 55°C and sections 6 to 11 at 60°C. A freshly prepared slurry of sodium bicarbonate (6 kg) in 42DE corn syrup (4 kg) was pumped into the open extruder vent at a rate of 2.5 kg/hr. The mass at 2760 kPa from section 11 was extruded through a circular die to form a continuous rope.

The rope emerging from the die (into a region at atmospheric pressure) was passed under a starch feeder to be coated with starch before being cut by a spring-loaded knife producing small cylindrical pieces. These were transferred to a vibrating conveyor to form approximately spherical pieces with a temperature of about 105°C and a uniform expanded structure. The pieces were equilibrated to 90°C so as to be in the "soft" state and then passed from the vibrating conveyor to a vacuum oven (temperature 20°C and pressure 5×10^4 Pa) so as to cool and set the pieces. On removal from the oven after only 3 minutes retention time, the pieces were crisp and had retained their uniform expanded structure.

Comparative Example 1

Example 1 was repeated, but after forming into balls, the pieces were cooled to 20°C at atmospheric pressure. The resultant pieces were more dense than those of Example 1 due to some loss of expansion, and the uniform expanded structure was lost. The pieces had a shrivelled appearance.

Comparative Example 2

Example 1 was repeated, but after forming into balls, the pieces were dried in a multi-pass drier at 101 °C at atmospheric pressure and then allowed to cool to ambient temperature. A drying time of at least 35 minutes was required before the uniform expanded structure was maintained after cooling.